



The Samdrup Jongkhar Initiative's Zero Waste Program

Program overview and recommendations

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Background:

The Samdrup Jongkhar Initiative's Zero Waste Program began in 2012 with two pilot sites in Bhutan's Samdrup Jongkhar Dzongkhag: Wooling village (rural pilot) and Dewathang town (urban pilot). The program has since been upscaled and expanded to Orong village and Samdrup Jongkhar town, with small community-driven side projects in Pemathang (Bangtar), Rishore, Narphung and Gomdar villages. This document details the basics of the implementation and monitoring of the program to date, with recommendations for the program's maintenance, expansion and replication. This writer was a coordinator during the first few years of the Zero Waste Program, recently returning to Bhutan to help build local capacity and assess the program after 8 months of management by local staff. This document is intended as a reference for Zero Waste Coordinators and support staff of SJI, but may also be useful for those implementing waste reduction projects in other parts of Bhutan or elsewhere in the world.

Philosophy:

As one of the world's fastest developing countries, Bhutan is fast establishing economic and social systems that produce increasing amounts of material waste while also sidelining traditional practices that prevent waste, like the use of *bangchung* (food basket/plate) and *gurbu/phub* (reusable cup). Combining traditional ideas and materials with outreach strategies that promote community initiative and human and environmental health, SJI's Zero Waste Program works to re-align development in ways that are both more sustainable and more locally appropriate. Averse to cleaning campaigns and other cleanliness-focused strategies that so often merely serve to demonize dirt and hide waste, SJI's Zero Waste Program defines zero waste as establishing systems and habits that make sustainable use of local resources, whether material, human or informational, without needlessly or excessively expending them. On a practical level, SJI's Zero Waste Program has initiated projects wherein increased awareness leads communities to decrease material waste while increasing their appreciation for nutritional whole food, traditional waste reduction practices, local business, ecological health, social engagement, and local knowledge.

People:

Program Coordination

For the first few years, SJI's Zero Waste Program was developed and managed by two foreign specialists from Sweden and the United States of America, with considerable help from local Bhutanese staff. In 2015, it was taken over by an all-Bhutanese staff. The program has typically been run with a Coordinator and an Assistant Coordinator, with occasional support from interns and staff from SJI's other program areas. Several consultants were hired over the years, primarily from India, to provide guidance in program sustainability and reuse craft techniques. Typically, at least one of the Zero Waste Program staff members has been heavily utilized by other program areas, resulting in staffing shortages and, as result, sometimes suboptimal or delayed monitoring and follow up. This has been greatly alleviated when staff from SJI's other program areas have stepped in to help with monitoring (as was the case with Dewathang's plastic bag ban initiative, for example). SJI's zero waste staff are expected to follow the values of the program, even outside of work. For example, staff members are expected to bring their own bag to the market and to avoid consumption of packaged food and drinks as much as possible.

Recommendations:

- *A minimum of two full time staff should be hired to manage SJI's current ZW Program, with an additional staff member for each two new additional program sites. If existing ZW staff members are pulled into other program areas, then an additional staff should be hired.*

Zero Waste Committees:

SJI's first administrative step in the program was to hold community meetings to establish a Zero Waste Committee in each project site. These committees are initially helpful in informing SJI of the local waste scenario, selecting a local Zero Waste Trainer for each site, helping to establish waste reduction infrastructure (i.e Material Recovery/Storage Facilities and segregation systems) and in spreading awareness in the community about the hazards of waste burning and reduction of plastic bag use, etcetera. Local town/village representatives have typically selected the committee participants based on a history of participation in town affairs and interest. SJI has initiated most of these committees with the expectation that they will then begin meeting on their own. This has been successful in some places, though usually fades with time. Ultimately, SJI will likely change this strategy. Rather than selecting Zero Waste Committees, SJI may instead work to integrate waste affairs into already existent community committees and nominate one or two point people to ensure that waste issues are consistently brought up at meetings.

In Dewathang, the Zero Waste Committee was difficult to mobilize until SJI initiated a plastic bag ban in collaboration with local shopkeepers. During the formalization and initial enforcement of the bag ban, an active committee was formed and operated with a sense of purpose. Now that the bag ban is running smoothly, the committee has once again fallen silent. The reality may be that SJI needs to occasionally provide communities with new campaigns and other tangible reasons for regular meetings until the community begins raising waste issues on their own.

In Samdrup Jongkhar town, the Zero Waste Committee is notably active. This is challenging when they perform duties not necessarily condoned by SJI, such as installing dust bins without collaborating with government officials or consistently conducting clean up campaigns, which are not part of SJI's Zero Waste Program. SJI's response has been that the committee may do as it pleases, but that it should act on its own behalf and not on behalf of SJI.

Recommendations:

- *Find ways of integrating waste issues into already existent community committees, and select one or two people to consistently raise waste issues in these meetings and report to SJI.*
- *SJI should conduct more campaigns associated with its activities (for example waste segregation), as it is an effective means of drawing support and spreading awareness in a more intensive manner.*

Zero Waste Trainers:

The first job of the Zero Waste Committees has been to assist SJI in the selection of a local Zero Waste Trainer in each project site. Occasionally, SJI will bypass the committee and select a trainer. The trainers are then trained by SJI Zero Waste Coordinators with the help of SJI's Zero Waste Manual, and, currently, paid 6,000 nu (about \$90 USD) per month for a year. In the future, trainers in more urban areas, with more shops and institutions, should probably be paid more than those in rural areas, especially after the first project year. Currently, trainers must come to the SJI office each month to receive their paycheck and present their monthly work plan.

In Wooling village, a new trainer was selected each year to give more community members experience in this challenging work. In Dewathang, interns have primarily been utilized in place of trainers. Currently, Dewathang has a trainer, who attends office hours much like an intern would. Over the years, SJI has learned that a proper work plan should be drawn up with trainers each month, and that trainers should submit

a monthly activity log prior to receiving payment each month. If trainers are not performing their duties while still receiving payment, this can cause conflict in the community, as has been the case in Wooling. Program coordinators should monitor project sites attentively enough to confirm whether or not the trainers are completing assigned or declared tasks. A complete TORs should also be drawn up for trainers, including expectations regarding number of hours worked each week/month and allowed time off.

In all program sites, the trainers administer baseline and/or impact assessment surveys to assess waste generation rates and waste management practices in each location. SJI ZW Coordinators should accompany trainers in the field to train them on the administration or surveys, and to assess their capacity to administer them. In some cases, selected trainers may not be capable, in which case ZW Coordinators and approved interns should conduct the surveys.

ZW Trainers are expected to facilitate the construction of a Material Recovery Facility (MRF) in rural sites with no formal waste collection system in place, which includes overseeing negotiations for land allotment and establishing a system for waste segregation, reception and storage. Wooling's Zero Waste Trainers have been responsible for establishing a system whereby households deposit their segregated waste at the community MRF once a month on a designated day. The Wooling trainer is thus supposed to open the MRF on the full moon of each month and receive segregated materials for a 5-hour duration. Households that bring their waste unsegregated can then be better oriented by the trainer on home segregation. Before a community becomes self-sufficient in zero waste management, this may be one of the first systems to break down. For example in Wooling, where the community had claimed to have taken ownership of the program, SJI began decreasing monitoring visits and, under a new trainer, this system fell apart and unsegregated waste began being dumped outside and around the MRF. SJI has had to take a step back to both train the trainer more effectively and conduct more frequent monitoring visits. It should be noted that, while trainers can be suitable informants for SJI in delivering status updates from the field, they are also tasked with ensuring smooth implementation of the project and thus may not be honest about project weaknesses. This was the case in Wooling, where the committee and trainers would prepare for SJI monitoring visits such that the program appeared to be moving better than it actually was. SJI responded by conducting occasional unannounced site visits.

Recommendations:

- *Zero Waste Trainers should be consistently trained throughout their term, particularly in presentation skills building and youth engagement. Monthly check-ins are a good time to do this.*
- *Finding ways to build fellowship among the different trainers could be an effective means of sharing information, promoting trainer self-sufficiency and boosting trainer morale.*
- *Trainer TORs still need to be edited to include expectations regarding hours and time off.*
- *Trainers should be compensated for their travel to and from the SJI office during their monthly check-ins.*
- *Trainers should be monitored giving presentations in schools or community meetings to assess their capacity throughout the project.*

Model Waste Reducers

A recent addition to SJI's Zero Waste Project is the objective to select and develop Model Waste Reducers in each project sites. This was modeled after SJI's Organic Agriculture Program's Model Farmers initiative, which selects model farmers to set a good example and help train other farmers on innovative farming practices. Model Waste Reducers are selected and developed with the same idea in mind. Monasteries were among the first Model Waste Reducers selected, as their events attract hundreds of people at a time, during which they can spread awareness on waste segregation and minimization of plastic packaged ritual offerings. Other ideal sites for Model Waste Reducers include schools, where waste segregation and the banning of

packaged snacks and waste burning can effectively spread waste reduction habits from kids to their parents and families; and shops, where the increased provision of non-packaged and bulk goods can be combined with a refusal to distribute plastic bags to set a good example in society. Shops are responsible for the bulk of waste production in Bhutanese communities, through the sale of packaged goods. But involving them in waste reduction strategies can both significantly curtail waste while also utilizing them as a site for outreach and awareness building. Community groups can also be selected as Model Waste Reducers. For example, Dewathang's Zero Waste Craft Group is currently being considered for Model Waste Reducer status in hopes that they may help provide the local community with reusable sacks for bulk food purchases, and an economically viable zero waste option for serving food and drinks at large events.

Recommendations:

- *The development of Model Waste Reducers is intended to be an intensive project that requires monitoring and follow up, ideally early in the project cycle so that they can stand as a community example and potential tour site for visitors and locals alike. Current selected Model Waste Reducers need to be further developed and monitored, with more community awareness of their designation.*
- *Selecting different types of Model Waste Reducers in different sites (i.e. not always monasteries and schools) will help SJI learn to better support different types of institutions and businesses.*
- *Narphung village was identified by SJI as a potential Model Waste Reducer community, though this may not be a suitable site for a number of reasons: Narphung is not a typical community (being comprised exclusively of roadside shops), and is therefore not a great model for other villages; The dust in Narphung requires that things be covered up and packaged, conveniently by plastics; Travelers stop there for a short period of time, thus selling in bulk or without packaging or plastic carry bags is less likely to work there than in other communities; finally, the community does not appear to be deeply engaged in the concept of zero waste.*

Baseline Research and Impact Assessment:

Baseline studies are conducted in all project sites to determine waste generation rates, treatment practices and attitudes about waste-related affairs. Surveys have been conducted with residents by Zero Waste Trainers, interns from Bhutanese universities and SJI coordinators. SJI coordinators also held information-gathering meetings with all local stakeholders and large institutions to gather qualitative data. In Dewathang, qualitative baseline data was also gathered through a series of recycled art workshops hosting 50-130 local kids from ages 8-18. During the workshops, one-hour writing assignments were given asking youth to give their ideas on topics like “the dust bin,” “garbage,” “development,” etcetera. The qualitative research helped SJI to initially understand the extent to which youth were oriented towards disposal and aesthetic cleanliness as an end goal for the country’s waste problem. This research framed the future of SJI’s Zero Waste Program, which underscores reduction, creativity and a deepened understanding of problematic waste treatment methods (like burning and dumping), while avoiding purely aesthetic solutions (like clean up campaigns).

SJI has recently begun implementing impact assessment surveys in existent project sites to track waste generation rates and attitudes about waste, and thereby measure the impact of their Zero Waste Program.

Recommendations:

- *SJI should continue using the existent baseline and impact assessment questionnaires so that data can be effectively compared over time.*
- *Baselines need to be conducted as early into the project cycle as possible (ideally before any intervention).*

- *SJI should start conducting surveys on a statistically significant sample size in order to get a more accurate assessment of impact. Sample sizes should be calculated with at least a 95% confidence level and a confidence interval of 5. Sample size calculator: <http://www.surveysystem.com/sscalc.htm>*

Outreach and Education:

Targeting Institutions:

SJI has conducted a number of trainings in schools and monasteries with both kids and teachers. These began as straightforward presentations about the hazards of burning and dumping waste, usually including a craft training to draw positive interest, and have evolved into more intensive trainings on nutrition (reduction of packaged food consumption), consumerism and building confidence as a means of reducing unhealthy materialism/consumerism. The Dewathang schools have largely sustained and improved upon the waste reduction practices taught to them by SJI. Monasteries have also maintained certain waste reduction practices, namely in spreading awareness about the value of offering non-packaged *tshog* offerings during rituals and events. The SJ Thromde Administration (government municipality) has also built zero waste practices into their work, including waste reduction outreach and the promise to establish municipal composting. SJI has perhaps benefited most from its strong relationship with NGO institutions like Clean Bhutan, which has shared SJI's advocacy materials widely throughout Bhutan, and the Agency for the Promotion of Indigenous Crafts, which has helped support SJI's zero waste craft programs. SJI has reaped benefit from institutions with listserves, that spread awareness materials and information throughout the region. These include Zero Waste Himalayas and GAIA (Global Alliance for Incinerator Alternatives). Zero Waste Himalayas, which has sponsored SJI and SJ Thromde staff to attend zero waste trainings in India in the past. And the GAIA list serve, which is an excellent resource for waste-related information sharing.

Zero Waste Craft:

SJI's outreach initially took shape as reuse craft ("zero waste craft") trainings conducted for youth and women, which included the dissemination of information about the hazards of burning and dumping of waste and, ultimately, waste segregation, reduction and nutrition. Craft has been the heart of the Zero Waste Program since its inception, as it provides an attractive and positive pretext for delivering information about waste reduction. In 2012, SJI brought this writer to Bhutan to conduct a series of large (40-130 kids), full-day trainings for youth at the Dewathang *shedra* (monastic school). The workshops were very successful in garnering local youth support for SJI's zero waste project, and kids have been begging for more workshops ever since. Holding such large workshops without a microphone, however, made it challenging to dispense in depth education about waste issues. The workshops demanded support from the entire SJI team and were, quite frankly, exhausting. SJI has continued to receive many requests for craft trainings, which compelled this writer to illustrate a series of craft tutorials, which are distributed with the Zero Waste Manual. SJI then turned to training smaller groups of kids and adults, many of whom now help SJI give community and school trainings.

Zero Waste Manual:

The Zero Waste Manual was developed by this writer in 2013 (and updated in 2016) to facilitate the training of Zero Waste Trainers and the community at large. Videos were made in 2015 narrating the text in both English and Dzongkha, to further facilitate training of trainers. ZW Manuals have been distributed widely to schools and institutions in Dewathang and Samdrup Jongkhar towns, and were designed so that individual pages can be pulled out and used as posters. Shared via Zero Waste Himalayas and GAIA, pages from the Zero Waste Manual are also being used in India.

Recommendations:

- *A written Dzongkha version of the manual still has not been made, largely due to SJI's inability to find volunteers capable of doing the translation, as it contains many technical terms new to, or inexistent in, Dzongkha. A Dzongkha version is necessary for the effective training of non-English speaking trainers and others. Funds for the professional translation of the manual should be included in the next grant application.*
- *The English version of the Zero Waste Manual video should be remade to include images that include the English text. When viewers are watching the video on Facebook, for example, they can then understand the meaning without turning on the audio. Furthermore, as the images were designed with words, they look much better with words than without. Once a Dzongkha text version of the manual is finished, Dzongkha images can also be put in the Dzongkha version of the video. Funds should be designated for this activity so that it can be done professionally and without reliance on volunteers.*

Tutorials:

Zero waste craft tutorials have also been developed for inclusion in the manual and for distribution around Bhutan to encourage people to take up and experiment with reuse practices. SJI is now looking into publishing these tutorials in Kuensel newspaper to further spread their impact.

Recommendations:

- *Simple tutorials can also be made illustrating some of the primary Craft Group techniques step by step, as members have a tendency to forget some of the sewing techniques for making bags and wallets. This can be done by taking photos of each step. Perhaps funds can be included in the next program cycle for zero waste craft women, with the help of Tshering Dukar or Karma Dema, to document the techniques each best knows (and use their new Photoshop skills), so that they can more readily be shared with other members who may have forgotten, or with new craft groups.*

Festivals and Supplements:

SJI has had a great deal of success educating large number of people during SJI-run festivals called Zero Waste Festivals, which were held in the project's first year in Dewathang and Wooling. The events included zero waste craft workshops, a reuse craft competition, composting and waste segregation demonstrations, organic local food served on banana leaves and speeches about waste reduction. While the festivals were very successful in raising awareness and garnering support for zero waste projects, they were capital and human resource intensive, requiring support from the entire SJI team. SJI's more recent strategy has been to conduct "Zero Waste Supplements," which involve providing supplemental waste reduction awareness at already existing festivals and events. Supplements have included the provision of banana leaves and bamboo cups in lieu of disposable plastic cups and plates, *Atsara* (festival clown)-led awareness building, and zero waste craft workshops and product displays. In the future, SJI will continue to hold exclusively SJI-run events, but will likely integrate all of its program areas (including Organic Agriculture, Appropriate Technology and Youth & Education) into the event.

Recommendations:

- *ZW Festivals are an excellent opportunity to emphasize or introduce zero waste ideas to the populace, such as the expansion of bulk food sales, the promotion of goods that are already zero waste (such as non-packaged soaps), the serving of actual juice from reusable containers, and the promotion of local traditions like washing with soap nuts, scrubbing with loofahs or using gurbu/phub (local reusable cups).*
- *See separate document detailing more ideas for the ZW Festivals.*

Campaigns

SJI has successfully conducted one major campaign working with Dewathang shopkeepers to ban the distribution of plastic bags in the market. The campaign was preceded by the posting of signs warning people that shopkeepers would stop giving plastic bags after a designated date. As that date neared, a press release was written that resulted in Kuensel publishing an article about the campaign. SJI also went around collecting old clothes from residents to be sewn into reusable bags and to spread awareness door to door. SJI facilitated regular meetings with local shopkeepers to discuss how they can best support shopkeepers in this initiative. SJI still regularly distributes posters and cartoons reminding people to bring their own bag, which are posted outside nearly all of the shops. While the occasional plastic bag can still be seen in Dewathang, there has been a considerable decrease in distribution. It has been one of SJI's most successful, measurable and sustained waste reduction efforts to date.

SJI has also made efforts that resemble campaigns, such working with local monasteries to discourage plastic packaged offerings by distributing Zero Waste *Tshog* (offerings) signboards and requesting monastic leadership to make announcements to the public encouraging them to bring non-packaged *tshog*.

Recommendations:

- *Now is a good time to follow up on Dewathang's plastic bag ban and check in with shopkeepers and the previously formed Zero Waste Committee. It may revive interest by the committee, and may also bring about some new ideas for next steps forward regarding waste in Dewathang. It would also be an opportunity to seek feedback on the newly installed waste segregation stations in DT Dewathang.*
- *An actual plastic bag ban campaign should ideally be started in SJ elsewhere, and could be run by the ZW Trainers there. Thromde enforcement officers could help monitor in SJ and also Dewathang.*
- *Conducting campaigns is a good way to draw in local stakeholders, especially during times when SJI staffing is limited in their outreach capacity. Likely issues include: waste segregation, e-waste collection and local bans on the burning of non-degradable waste. A more concentrated campaign encouraging zero waste events could also be developed, including signs requesting that people bring their own cup and plate to events, and that they bring non-packaged offerings to religious events. Press releases should be written at the start of every campaign.*

Community Mapping

Community mapping is another idea taken from SJI's Organic Agriculture program, which developed an organic agriculture resource list for the region. SJI is now in the process of developing a zero waste resource list, which will include ideas gathered through a community mapping exercise carried out in each program site to gather comprehensive information about where people can access waste reduction products and resources. Such resources include: waste segregation stations; material recovery facilities; scrap dealers; reuse crafts people/groups; shops where products can be purchased in bulk (rice, *daal*, *maida*, etc.), without packaging (laundry and dish soap) or with degradable packaging (paper wrapped incense and rice noodles (*fin*)); shops that refuse to give plastic bags; shops that sell reusable bags; people/businesses skilled in repair; shops that sell *bangchung*, *gurbu* and *tore*; shops that will reuse paper egg cartons; people who are knowledgeable about specific waste reduction practices (including composting, crafting, recycling, etcetera). These resources are currently being documented on an Excel spreadsheet. Ultimately, they will be combined with simple maps and provided to the local community not only to help consumers consume in a less wasteful manner, but also to encourage shops to provide more of such resources.

Permanent Education Tools

SJI is now in the process of establishing landmarks that can serve as long term educational tools. Such landmarks include a bulletin board in downtown Dewathang where educational posters can be posted. SJI is

also developing Dewathang's now defunct Lamtshorong dumpsite into a trail site complete with educational signboards and a large waste-based sculpture to help draw attention to the site. The dumpsite still contains a great deal of garbage, thus the location will serve to help visitors see and understand the lasting impacts on non-degradable waste. With the past disposal of vegetable waste, there are now vegetable plants growing in the waste, which could be an interesting way to engage science universities in the future to test the quality of the vegetables and see if there has been any harmful impact to the food and soil in and around the dump.

Recommendations:

- *Downtown Dewathang needs a bulletin board. If SJI pushes this issue under the current Thrompon (mayor), we can have one installed. He has already promised us one in the past. As per Dasho Neten's past request, Cheku should write a follow up letter to Dasho Thrompon on this issue.*

Publicity

SJI's Zero Waste Program and activities have been covered by BBS and Kuensel various times over the years, particularly highlighting zero waste crafts. Some of this coverage can be found on SJI's website and Facebook page. In 2015, this writer submitted SJI's first zero waste article to Kuensel, which described the hazards of flex banner/PVC. Submitting articles and tutorials to Kuensel, in addition to videos to BBS, could become a regular component of SJI's outreach and education.

Infrastructure and Systems:

Balancing the development of infrastructure with the establishment of new systems can be a challenge in waste management interventions, as the former requires physical and financial inputs while the latter demands considerable local participation and educational outreach. If waste management systems do not shift to accommodate new infrastructure, then the infrastructure is easily rendered useless. At the same time, if new systems are not supported by appropriate infrastructure, then the system will fall apart. SJI has attempted to balance the two components with help from the following infrastructural inputs:

Waste Segregation Stations:

Dewathang Shedra:

In 2013, SJI was granted funds from the UNDP to develop waste segregation stations at Dewathang's Chokyi Gyatsho Institute. Hoping to take advantage of expertise and energy at the local polytechnic university, SJI launched a design competition to source good designs for waste segregation stations at the monastery. The stations were to have five bins based on categories that the monastery had helped designate (bottles/cans, paper/carton, wrappers/shoes, old clothes, food waste). A design was selected by the monastery and the students were given a modest cash prize. Students were then involved in building the stations. Ultimately, the monastery wanted one of the student designs built, and four other stations built based on a more simple design drawn by this writer to accommodate removable bins that can be locked to the station. The student design included a rotating mechanism that gave the station the appearance of a prayer wheel. Thus, SJI has them include a bell so that, like a prayer wheel, one full rotation of the station rings a bell. Despite that two of the signs have fallen off the station, people still seem to be segregating waste in that station better than in any of the others, which maybe due to the fun interactive nature of the station. Older monks were educated on the importance and usage of the stations, though no education has yet been dispensed to the new young monks. Recently additional single bins were donated to the monastery and have been placed around the campus. This has broken down the waste segregation system, as plenty of people dump their waste together in the individual bins. If waste segregation is to work, the bins must be placed together, with effective signage that includes illustration and writing in all relevant languages, and with no disposal alternatives besides waste segregation (such as individual bins).

Downtown Dewathang and SJ town:

Inspired by the segregation stations at the monastery, a group of local youth raised funds to build large segregation bins for downtown Dewathang. This initiative was ultimately a failure, for a few reasons. First, the bins were designed without consulting those people responsible for collecting waste- the local sweepers. They complained that the bins had big holes in the bottom through which waste falls, and had sharp edges at the top that made handling difficult. The sweepers dumped leaf waste in all of the bins and never seemed to participate actively in the segregation. This could also be because no collaboration was sought with the SJ Thromde to assure that materials be collected separately (rather, they were all dumped together once emptied into the dump truck). Finally, the bins were not fixed to the ground, so were dispersed around town as individual bins, which is a sure way to undermine segregation. SJI ultimately replaced those bins with stationary bins. The sweepers still complain that the bottom holes are too large. Surprisingly, and likely due to SJI' long history of waste-related outreach in Dewathang, segregation is largely being practiced, despite that SJI mistakenly put out only three bins (wrappers; paper/carton; bottles/cans), neglecting one for organic waste. Thus, organic waste is being dumped in the carton/paper bin. Segregation is slowly worsening, likely because SJI has still not been able to count on collaboration with the SJ Thromde to ensure that materials are separately collected. This generates disillusionment over the segregation process, and will likely result in failure.

In SJ town, SJI installed segregation stations without broad educational outreach or Thromde collaboration, and the segregation is not working at all.

Wooling:

In Wooling, where no public waste bins were present, introducing community waste segregation would have meant designating people to empty those bins and monitor segregation. This didn't seem realistic, since there is no formalized waste collection in Wooling, and SJI is not willing to hire anyone for the long term, so the system seemed likely break down without anyone hired to fill this role. Thus, the community decided that shops should have segregation stations to serve as educational tools for the community, which were simply made by pasting signs onto cardboard boxes. Shopkeepers managed the materials themselves, and, therefore, participated in educating children and adults on the implementation of segregation. Once those bins fell apart, though, they were not replaced. Most shopkeepers do manually segregate materials, though this does little to educate the public about ideal segregation categories.

In general:

Public or Institutional waste segregation stations mean that someone has to be responsible for emptying them. Thus, it is important to include those people in the process of designing or implementing waste segregation, and to ensure that materials will be separately collected to avoid public disillusionment.

Recommendations:

- *SJI should not initiate segregation systems without the explicit participation of those people and institutions collecting the materials to collect them in a segregated manner.*
- *Campaigns should be launched alongside the introduction of segregation stations to ensure broad awareness and participation.*
- *As per the sweepers recommendations, future dustbins need to have smaller wire mesh so that materials do not fall through.*
- *SJI should verify the segregation categories with local stakeholders, rather than determining them for them. Segregation categories will differ depending on the community/institution and changes to the recycling and reuse markets.*

- *Recently, some people have expressed dissatisfaction over the presence of Dzongkha writing on the dustbin signs. By law, Dzongkha and English must be written on public signs in Bhutan. Furthermore, SJI should work to address the stigma against waste that causes this bias, such that people grow comfortable with the usage of Dzongkha for waste labeling.*
- *SJI will ultimately need to start deepening its interventions in all sites to begin addressing e-waste and sanitary waste (diapers and sanitary napkins). Currently, e-waste should be stored in homes or collected and stored until the federal government and Thromdes come up with their national plan on e-waste (supposedly being worked on in 2016). Recycling is a good option for e-waste, but only if the recycling processes do not involve hazardous procedures like open acid baths and burning. As for sanitary waste, this is more complex. Sanitary pads and diapers are made with chlorine, and are therefore very hazardous when burned. In the future, SJI should promote cloth diapers and sanitary pads. In the meantime, discussions with the local community can be held to find the best solution for disposing of these materials while preserving the hygiene and health of waste workers.*
- *Dewathang's Zero Waste Craft Group could experiment with designs for durable non-metal (metal rusts quickly during monsoon season) public dust bins woven from plastic bottles, perhaps in collaboration with the local polytechnic school.*

Material Recovery Facilities:

Having a place to collect and store materials is extremely important, especially in rural sites where transportation to scrap dealers and disposal facilities may be infrequent. Furthermore, the recycling market can fluctuate dramatically, thus storing materials until the market revives can help secure better profits.

SJI has constructed three MRFs in Samdrup Jongkhar Dzongkhag to date. The first was constructed in Wooling village in 2013 based on a design that the villagers submitted. Because segregation adoption has been slow in Wooling, the MRF was initially filled with non-segregated materials, which were dumped in the SJ landfill after one year, with transportation help from the Dzongkhag Administration. Since then, waste has been somewhat segregated and the Wooling community is now taking charge of the responsibility of emptying it. The Wooling MRF is currently being rebuilt based on a design submitted by this writer and the local community. The new MRF will be larger and contain separate rooms inside to ensure maintained segregation of materials during storage. It will also contain a chute down to the road so that materials can be easily emptied into vehicles. The original MRF was made primarily from CGI sheet, and looked out of place in Wooling. SJI is requesting that the new MRF be constructed from local materials, so that it fits in with the local aesthetic.

A second MRF was constructed at Dewathang's Chokyi Gyatsho Institute in 2014 as part of a UNDP-GEF grant implemented by SJI. The design was developed by this writer, though was ultimately constructed to be smaller and without segregation barriers inside. Now, CGI is wishing they had built the MRF larger and with segregation barriers, indicating that local ownership and understanding of MRFs takes time. In the future, if communities can store materials in an empty room for some time before deciding on the location, size and style of MRF, it may lead to the community adopting a more appropriate design and location.

A third MRF was designed from metal by the Jigme Namgyel Engineering College and installed in Orong village. The design was made to be portable, with the idea that it could be replicated for other villages in Bhutan. Unfortunately, it was not ultimately to SJI's satisfaction- the metal seems out of place in a village setting, the MRF is too small for large villages like Orong, and it was designed to be accessible to anyone any time-- without the ability to lock it, which will likely lead to community misuse. As result, Orong constructed a barbed wire fence around the MRF to keep the public out of it, which only exacerbates its poor

appearance. Future MRFs will be built with local materials and more community participation in the design process.

Recommendations:

- *Design an MRF that can be built by the local community with natural, local materials. The MRF should be lockable, aesthetically pleasing, large enough for the respective community, set in a location that facilitates emptying and contain separation barriers/walls inside to better enable segregated storage of materials that may not necessarily be stored in sacks.*
- *Zero Waste Trainers need to be tasked with opening the MRF once a month so that materials delivery can double as an opportunity to train the populace on household segregation.*
- *It may be wise to have households collect one month of waste, which can be measured to estimate a year's worth of community waste, so that the size of the MRF is able to house at least one year's worth of community waste.*

Systems:

Waste management systems vary considerably depending on a project's location and the municipal services it receives. In places like Wooling and Orong, where no municipal waste collection or formalized dumpsite have been designated, SJI has considerably more freedom in what it and the community decide to implement. Typically, rural sites will first require a Material Recovery Facility, where residents can bring their segregated waste once a month. A Zero Waste Trainer, currently hired by SJI but, in the future, paid by the community or Gewog Administration, facilitates the monthly reception of materials and segregation awareness. Once a year, materials are sent to Samdrup Jongkhar city where they are recycled and, if recycling is not an option, dumped at the sanitary landfill there. Transportation fees are either paid by the community (see Community Waste Fund below) or else materials are transported on voluntary vehicles that pass through the village. In the future, as more villages develop similar waste management systems, the Dzongkhag Administration or Gewog Administrations may want to look into establishing a transportation system to regularly (every few months) collect material from these sites. If these communities are insistent on installing public waste segregation stations, then they must first establish an economic system for paying someone to regularly empty those bins (see Community Waste Fund below). Otherwise, as is the case in Orong (the success of which remains to be seen), rely on nearby shopkeepers to manage the stations.

In urban sites, SJI has merely supplemented already existent municipal waste collection by encouraging households and institutions to save and sell their recyclable materials. Working in these locales is challenging because simply installing segregation stations and promoting segregation will not necessarily lead to increased material recovery if the municipality cannot ensure that those materials remain segregated and make it to scrap dealers. Thus, much of the systemic work that occurs in urban areas as part of SJI's Zero Waste Program involves building stronger relationships with local government. If the government is willing to adopt waste reduction systems, they can benefit from SJI's wide reaching education and outreach efforts.

Community Waste Fund

A recent systemic addition to SJI's Zero Waste Program is the establishment of Community Waste Funds in rural sites without formalized waste collection, currently including Rishore, Narphung and Orong villages. In Rishore, community leaders collect 60nu /mth from each household, in Narphung 100 nu/month/household is collected, and in Orong 200 nu/ household/yr is collected to cover the costs of cleaning the community and transporting materials from the village to recycling and disposal centers. Ideally, this fund will also cover the costs of hiring a point person to oversee the waste management system,

much like a Zero Waste Trainer. SJI has developed by-laws for the community waste funds to help facilitate and develop this process.

Economic Diversification:

A zero waste philosophy only works on a large scale so long as it is integrated into economic systems. As such, SJI has worked to diversify reuse, recycling and reduction-based businesses in Samdrup Jongkhar.

Recycling:

One of the easiest ways to promote zero waste through business is to increase recycling rates and access to recycling markets, in this case by encouraging new groups and individuals to begin selling materials for recycling. Schools and institutions like Dewathang Primary School and Chokyi Gyatsho Intitute were some of the first to begin storing and selling plastic bottles, which were previously being burned or dumped. The development of an MRF in Wooling enabled the community to store and sell bottles and other materials like shoes, glass and paper. With inputs like large segregation bins and MRFs, SJI is now expanding recycling ventures of this type to places like Orong village and Dewathang's Garpawoong Middle Secondary School.

Communities with scrap dealers are much more likely to sell their waste for recycling rather than burn it. In Bhutan, it is difficult to maintain scrap dealing businesses as transportation of materials and proper financial management pose considerable challenges. SJI has worked to promote scrap dealing with little success thus far, and is investigating ways that it can better support the development and sustainability of scrap dealer businesses.

SJI has also assisted a couple of recycling entrepreneurs in their attempts to secure a niche in Samdrup Jongkhar. The first was Tshering Dorji, one of Bhutan's first recyclers. This writer met Tshering Dorji in Barthsam in 2013, and subsequently helped him develop a proposal to start a small business in SJ, which was ultimately rejected by the SJ Thromde as they were looking for someone who would take responsibility for the entire waste management system rather than just recycling. They also seemed to doubt his ability to maintain a profitable business in SJ, where there is considerable competition from scrap dealers. Tshering Dorji ultimately found an opportunity to start his business (now called Evergreen Waste Care & Recycle) in Doksum, Tashiyangtse. He remains in communication with the SJI Zero Waste team, and has adopted a business plan to both recycle and carry out advocacy similar to that of SJI's ZW Program. Another prospective recycler, Mr. Rayna Kuendrup, approached SJI seeking feedback to start a recycling company in SJ. This writer edited his proposal, and recommended that he find data about current material production rates in SJ in order to better prove the economic viability of his project, which includes the collection of materials throughout the East, and machines to: bale and chip plastics, and recycle paper into either egg crates or disposable paper cups and plates. This writer recommended that he not consider recycling paper into disposable paper plates and cups, as SJI would not promote the production of disposable for which there are better local alternatives (banana leaves and durables).

SJI has also explored the possibility of working with the Jigme Namgyel Engineering College to develop local recycling machinery, which is something they are interested in. After having sent them two different models for plastic pres machines, which could recycle plastic bags, wrappers and films into boards, JNEC took no further action citing that it might be difficult to find the necessary materials to construct the machines in Bhutan. This writer still has information about both of those technologies, which are worth exploring in the future if the necessary materials can be found. Other alternatives that JNEC seemed interested in exploring include developing pedal (bike)-powered machines for shredding and washing materials, which could be especially helpful to the Dewathang Zero Waste Craft Group and other small scale reuse ventures.

Recommendations:

- *SJI could better support scrap dealers by supporting select entrepreneurs with the purchase of pet bottle bailing machines (shredding machines have not proven effective in Bhutan as the blade frequently becomes dull and is difficult to take to India to have repaired). A bailing machine costs, on average, about 1 lakh 80,000, according to Tshering Dorji.*
- *SJI can investigate providing scrap dealers with training in financial management, proposal writing, recycling technology, etc.*
- *SJI should continue to explore the establishment of private or government systems for transporting materials from rural areas as a means of assisting rural scrap dealers. Materials could be purchased by the government from scrap dealers for slightly less than they can sell them for in Phuentsholing, which would offset the cost of transporting materials.*
- *SJI should advocate for the lowering the interest rate on loans to scrap dealers.*

Reuse:

Dewathang's ZW Craft Group:

Since the beginning of SJI's Zero Waste program, SJI has been working towards the development of reuse craft businesses to serve both as a means of reusing non-recyclable materials in villages and to serve as a tool for attracting people to SJI's Zero Waste Program and local waste issues. In 2012, this writer was hired to give a series of trainings to Wooling women on foreign reuse craft techniques that required basic hand sewing and cutting skills. Despite that the women are skilled textile weavers, they did not excel at other craft techniques and their initial reuse craft samples were roughly executed. Because they lacked confidence in the ability to ultimately sell these types of products, they did not continue practicing nor improving upon the techniques. In 2013, this writer returned to Bhutan and learned local weaving techniques, and then developed new reuse techniques by incorporating discarded materials. These new techniques, being based in traditional weaving, were picked up quickly by local women. Initial attempts to form a formalized craft group were slow, as women were doubtful that anyone would want to buy something made from waste materials, which was a new concept in Bhutan. SJI intern Tshering Dukar helped considerably in recruiting women and keeping them connected with SJI. Tshering Dukar was later hired by SJI as the Dewathang Zero Waste Trainer, also responsible for monitoring the craft group and seeking out marketing opportunities for their products. The growing popularity of bags woven from plastic bottles, which popularly became known as "Dewathang Bags," encouraged women to attend product development trainings. JK Rinpoche also assisted this project by ordering 300 *shoskom* baskets made from plastic bottles, to be given as gifts during the opening of the Dewathang *shedra*. This writer developed a technique for weaving *shoskom* from plastic bottles on a loom and trained a dozen women. The technique being difficult, initial samples were roughly executed. But, because a commitment to purchase 300 *shoskom* had already been made, the women pushed through and are now producing high quality *shoskom* baskets. SJI has had success in financially incentivizing experimentation by placing orders for certain products, even if the products are not high quality at first. Recently, SJI ordered a plastic wrapper weaving from each of Dewathang's Zero Waste Craft Group members (of which there are now 16), and is using those textiles to produce product samples that the ladies can later copy. The Dewathang group received training from a tailor sent by APIC (the Agency for the Promotion of Indigenous Crafts), and is now expanding its product line to include more reuse and hand woven textiles. The Dewathang craft group members have also been hired to train other women in the Dzongkhag on reuse craft technique, including a newly established Zero Waste Group in Pemathang. ZW Coordinator, Mr. Cheku Dorji, also assisted this process by developing by-laws for the craft group, which are being experimented with and adapted to the needs of the women. Now that the women are trained and producing marketable products, efforts are being made to deepen their understanding of waste issues and fortify their commitment to waste reduction in the community.

Recommendations:

- *Semi-regular training and reminding should be administered to the Dewathang ZW Craft Group to ensure that they are engaging in basic ZW practices, such as bringing their own bags to the market.*
- *As much as possible, SJI should help find buyers for new products so that orders can be made, forcing the artisans to master new techniques.*
- *Members need to be trained on book keeping ASAP, with initial follow up.*
- *SJI should strengthen its relationship with APIC in search of marketing assistance. APIC can help SJI sell its products in Thimphu's Craft Bazaar, which would be of immense help to the group.*
- *SJI should assist the craft group in maintaining the use of educational labels.*
- *Continue to set aside funds for the purchase of initial products to encourage experimentation, especially for the development of new craft groups.*
- *Make Dewathang's group self-sustaining before moving on to a new group. These groups take time and will likely need some continued support from SJI until their products are high quality and they are able to manage marketing and sales on their own.*
- *Before starting any new groups, evaluate local craft techniques and develop a new product line with the group so that they are not in competition with the Dewathang women (as will likely be the case with the Pemathang group).*

Shoe Repair:

Under the initiative of ZW Coordinator Mr. Cheku Dorji, SJI has begun training people on basic shoe repair in hopes that small shoe repair businesses will crop up in the area. One Orong resident has committed to starting a shoe repair shop in his village, thus far, though time will tell whether or not this can be an economically viable means of reducing waste in Samdrup Jongkhar Dzongkhag.

Reduction:

SJI initiatives like Dewathang's plastic bag ban help to reduce waste and do save shopkeepers money if all shops are equally participating and refraining from giving too many alternative paper bags. SJI's next step in reduction-based economic diversification will likely involve the promotion and expansion of bulk food sales and the sale of non-packaged goods, with Dewathang as an initial pilot site. In Dewathang, some products are already offered in bulk, including rice, and others sold without packaging, including some laundry and dish soap. Through SJI's Zero Waste Community Resource Map, which is currently in development, SJI will promote shops that are selling such goods in hopes that it will encourage such activities among shopkeepers. As part of SJI's Model Waste Reducers component, SJI will also likely begin piloting certain shops to sell additional products, such as *daal*, beans, and other dried goods, in bulk. Dewathang's Zero Waste Craft Group can then be utilized to sell and encourage the use of cloth bulk food bags, so that consumers are not simply using plastic when buying in bulk.

Promotion of Traditional Values:

SJI is a strong advocate of traditional values that promote reuse and waste reduction, such as the use of reusable cups (*gurbu/phub*); reusable home made food carriers (*bangchung*); the serving of festival/puja meals on degradable materials like banana leaves and areca nut plates; the sale of items wrapped in natural materials such as butter in banana leaves; and the use of *jolas* and other traditional carp bags instead of plastic bags.

Recommendations:

- *Pilot a bulk food sales campaign at SJI's next Zero Waste Festival.*
- *Establish a system for serving zero waste juice (real juice, not packaged juice) at community events.*
- *Update the ZW Community Resource Map every six months and post it on the local bulletin board as an incentive for more shopkeepers to provide zero waste goods.*

Funding:

SJI's Zero Waste Project was initially funded for by the Civil Society Organization Facility Fund (CSOFF), which provided about \$13,000 USD for a period of one year. The Zero Waste Project was initially staffed by one coordinator, with considerable assistance from the organization's 4 other staff members. IDRC covered staff salaries, and about \$15,000 per year for the next two years of the project. The project's fourth year is currently being funded with about \$30,000 USD from the Bhutan Trust Fund for Environmental Conservation, including \$10,000 USD for staff salaries funded by the Maitri Trust.

The Big Picture: Recommendations for SJI's next ZW Program cycle:

Without funding for additional Zero Waste Program staff, SJI should not add any additional program sites to the next phase of its Zero Waste Program. Rather, SJI should focus on deepening interventions in current program sites, and set aside time to consult other gewogs and communities that hire SJI to conduct trainings for the new establishment of Zero Waste Programs throughout the Dzongkhag. In current program sites, the following is recommended during the upcoming phase of the program:

- Try to apply for multi-year (2-3 years) funding from BTFEC in the Spring of 2016 to minimize grant writing.*
- Develop a functional and formalized plan for collaboration with the SJ Thromde regarding the collection of segregated materials, composting, e-waste management, improved management of hospital waste and advocacy and outreach (Dewathang and SJ Throm).*
- Monitor the functioning of Community Waste Funds, but set aside minimal funds for educational intervention and assistance if necessary (Orong and Wooling).*
- Discontinue Zero Waste Trainers in sites with a functioning community waste fund (which should be used in part to hire their own trainers), but include funds to hire Dewathang-based interns to monitor program sites. Maintain a ZW Trainer in SJ town, who shall be responsible for conducting waste reduction campaigns (plastic bag ban, segregation, etc) there.*
- Discontinue Zero Waste Committees, but develop a plan for integrating waste issues into already established community committees. Select waste spokesperson for each community committee, and develop the waste-related awareness of these individuals.*
- Deepen interventions in urban pilots to explore possibilities for improved management of hospital and sanitary waste (all sites).*
- Conduct broad campaigns (plastic bag bans, waste segregation, nutrition-based reduction in packaged food consumption) in collaboration with local and national institutions, including Clean Bhutan (all project sites).*
- Monitor and adjust bylaws for Community Waste Funds and Craft Groups (all program sites).*
- Continue the monitoring of Dewathang's Zero Waste Craft Group while continually reducing assistance. Once they are self-sufficient, SJI can begin exploring sites in which to establish another craft group (one which develops different products).*
- Conduct Zero Waste Supplements in all program sites.*
- Deepen and expand Model Waste Reducers in all program sites.*
- Update the Community ZW Resources list/map.*
- Conduct impact assessments in all program sites upon completion of the next program cycle (Summer of 2017).*
- Continue development of environmental clubs in schools (Dewathang, Orong, SJ town), perhaps drawing on expertise of RSPV's Wamrong staff member.*
- Further develop Lamtshorong educational site (Dewathang).*

- *Consider developing a central workshop space for the Dewathang ZW Crafts Group that can also be used for other types of workshops.*
- *Strengthen relationships with Gewog Administrations and Dzongkhag Administrations to establish a better system for transporting materials from rural communities.*
- *Develop a signboard discouraging the use of plastics for downtown areas in villages and towns (modify current tshog signboard to be used in other areas?).*
- *Develop SJI expertise in e-waste and sanitary waste management.*